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ABSTRACT

Facial expressions produced by an infant during the first 8 weeks of life were observed and recorded by the infant's mother, who was trained in several anatomically based systems for coding facial expressions. Data records included diary entries and videotape recordings. Instances of facial expression patterns currently considered to be expressions of distress or pain, anger, sadness, disgust, happiness, and surprise were observed and recorded. Three expression patterns, for sadness, surprise, and anger, were observed earlier than had been previously reported. Some expression patterns, such as the surprise configuration, were not associated with external stimuli which adults would consider likely to elicit such patterns. All expressions, however, were organized to some extent by environmental events. Seventeen references are listed. (RH)

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# Darwin Revisited:
# An Infant's First Emotional Facial Expressions

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## Abstract

Facial expressions produced by an infant during the first eight weeks of life were observed and recorded by the infant's primary caretaker. The caretaker was trained in several anatomically-based systems for coding facial expressions. Data records included diary entries and videorecordings. Instances of facial expression patterns currently considered to be expressions of distress-pain, anger, sadness, disgust, happiness, and surprise were all observed and videorecorded. Three expression patterns (for sadness, surprise and anger) were observed earlier than previously reported. Some expression patterns (e.g. the "surprise" configuration) were not associated with external stimuli which would be considered by adults to elicit the corresponding emotion. However all expressions were organized to some extent with respect to environmental events.

In 1872, Charles Darwin described facial expressions produced by his own infants as part of a general treatise on emotional expressions in animals and man. Darwin's observations were largely ignored or rejected for almost a century. However, recently there has been a renewal of interest in infant affect and some - but not all - of the facial expressions of emotion described for adults have been observed in infants in controlled-setting studies. However, virtually no one since Darwin has attempted to make naturalistic observations of infant emotional expressions starting at birth.

## Method

This paper reports naturalistic observations made on a single infant during the first eight weeks of life. Observations were made by the infant's primary caretaker (her mother) who was trained to use Ekman and Friesen's (1978) Anatomically-based Facial Action Coding System and also Izard's (1983) MAX and AFFEX systems for coding infant facial expressions. Observations were recorded both in the form of paper-and-pencil diary entries and on videotape according to the following procedure: a) Instances of facial patterns currently considered to be expressions of distress-pain, anger, disgust, sadness, happiness, fear and surprise (Ekman & Friesen, 1975, Friesen & Ekman, 1984, Izard, 1983) were recorded in the form of diary entries when (and if) they were seen by the observer. The diary entries included information about the situational context (apparent elicitors of the expressions) and also co-occurring body movements and

vocalizations when these were noted by the observer. b) Subsequently, videotapes were made of situations similar to those during which the expressions were originally observed. The videotapes were coded by the primary observer who identified instances of the target expression patterns. To establish reliability, a second observer trained to use the facial expression coding systems also scored a subset of the data. Conventional levels of reliability (exceeding .75) were achieved for the identification of each expression. Results reported here are based on observations captured both on videotape and in the diary entries.

## Results

Four inter-related questions provided a focus for the data reported here:

1. At what age was each expression pattern first observed?

2. Do the facial expression patterns appear to be related to distinct eliciting circumstances and/or accompanying vocalizations and body movements?

3. Is there a common factor or family relationship among the eliciting circumstances for expression pattern?

4. Are the eliciting circumstances observed for each expression consistent with current theories of emotion and emotion elicitation?

The facial expression patterns for distress-pain, sadness and anger (see Figures 1, 2, and 3) were first observed on Day 1, Day 1 and Day 35 respectively. As seen on Table 1, there was almost

complete overlap in the eliciting circumstances observed for these expression patterns. In fact, the three expressions often co-occurred in a single bout of crying. The distress-pain expression occurred when crying was most intense. After the fourth week (when the infant began to keep her eyes open for longer periods of time), the anger expression would sometimes occur during somewhat less intense crying. The sadness expression tended to occur as crying waxed or waned. The sadness expression was associated with a less intense vocalization than distress-pain or anger since the mouth was closed or closing when the expression was produced. However, no distinctions in body movements accompanying the distress-pain, anger, and sadness facial patterns were identified. The observed eliciting circumstances for these expressions were all situations that might be predicted to produce distress in infants. Thus these observations suggest that the facial expression patterns for distress-pain, anger, and sadness may not reflect qualitatively different emotions in infants at this age. As suggested by Bridges (1932) and others, differentiation among the negative emotions may occur later in development. During the first two months, the facial expression patterns for all three negative emotions appear to be involved in a generalized distress response.

Several of the facial expression patterns described for disgust by Friesen and Ekman (1984) and Izard (1983) were observed starting on Day 2 (see Figure 4). As seen on Table 1, disgust expressions sometimes occurred in the same situations as the

expressions of distress-pain, anger, and sadness. However distinctions in eliciting circumstances also were noted. As opposed to the expression patterns for distress-pain, anger, and sadness, the disgust expression never occurred upon cessation of soothing physical contact or cessation of kinesthetic stimulation. In addition, the disgust expression was not accompanied by any vocalization or by the type of "frantic" limb movements which sometimes occurred during intense crying. Although disgust expressions often occurred in response to non-taste stimuli, the sour-vitamin taste elicited the most extended and elaborate version of disgust which was observed. As suggested by Darwin (1872/1965) and the subsequent work of Peiper (1963), Rosenstein and Oster (1987) and Steiner (1979), disgust expressions usually appeared to be "defensive" or "rejection" responses to intrusive stimuli rather than a generalized distress response.

The complete facial expression pattern for fear was not observed during the first eight weeks. However the mouth movement associated with fear often occurred during "fussing" and was accompanied by lowered or oblique brows. Subsequently (in the fourth month), the fear expression pattern occasionally was observed when the infant fussed or protested while looking up at the observer. This occurred both in situations which adults might label fearful and also in other situations (eg., while the infant protested being fed solid food).

The facial expression patterns for surprise and happiness generally occurred in different circumstances than did the

expressions of distress-pain, sadness, anger, and disgust (see Tables 1 and 2). The expression pattern for surprise (see Figure 5) was first observed on Day 10 as the infant turned her head to grasp the nipple. In subsequent weeks, the expression occasionally re-occurred in this situation but appeared to be a fortuitous coincidence of raised brows (a frequent facial movement) and the rooting response. Starting in the ninth week, the facial pattern occurred during bouts of "excited" visual attention to the environment. That is, the expression was accompanied by panting vocalizations and batting movements of the arms and legs. Subsequently the expression has been observed in association with reaching, grabbing, and mouthing objects. Consistent with previous studies of older infants and children (Charlesworth, 1970; Hiatt, Campos and Emde, 1979; Vaughn & Sroufe, 1976) the surprise pattern was not typically observed in surprise situations. As claimed by Peiper (1963), the surprise expression pattern appears to be associated with orientation/approach rather than surprise per se.

Smiles were first observed on Day 1 during sleep (see Figure 6). Consistent with the previous reports of many investigators (e.g. Wolff, 1967, 1987; Emde & Harmon, 1972; Sroufe & Wunsch, 1972), smiles occurred both during sleep and in response to a variety of social and nonsocial stimuli (see Table 2). Nonsocial eliciting situations included circumstances which might be considered to involve tension-reduction (e.g. after sneezing, after feeding) as well as mild increase in stimulation (e.g.

stroking the cheek, massaging the back). For adults, smiles of happiness have been distinguished from non-happy (e.g. deceptive or miserable) smiles by the involvement of m. obicularis oculi (the muscle orbiting the eye) and the absence of facial muscle movements associated with negative affect (Ekman & Friesen, 1982). For the infant observed in this study, smiles involving negative facial muscle movements were not observed. No clear distinction could be made between eliciting circumstances for smiles involving m. obicularis oculi vs. smiles not involving this facial muscle. In infants, the independent action of m. obicularis oculi is difficult to identify when a broad smile occurs and lifts the cheek pads. Such broad smiles occurred occasionally during sleep as well as in response to social stimuli. Thus no clear morphological distinction could be made between smiles occurring in circumstances which adults might consider happy vs. smiles occuring in other circumstances (e.g. sleep smiles).

## Conclusions

These observations confirm that facial expression patterns described for a number of emotions are present during the first few weeks of life. However, many of the expression patterns are not associated with eliciting circumstances as would be predicted by current theories linking the expressions to distinct emotion programs. More specific conclusions regarding the elicitors for these expressions must be considered provisional since only one infant was observed and inferences about eliciting circumstances were made by only the primary observer. Nevertheless, this

investigation produced data that clearly fit no simple theory of facial expression-emotion relationships. Further study is required to confirm these observations in a larger sample of infants and to further investigate the proposals made regarding eliciting circumstances for the facial expression patterns.

References

Bridges, K.M.B. (1932). Emotional development in early infancy. Child Development, 3, 324-341.

Charlesworth, W.R. (1970). Surprise reactions in congenitally blind and sighted children. National Institute of Mental Health Progress Report.

Darwin, C. (1872). The expression of the emotions in man and animals. London: John Murray, 1872. Reprinted Chicago: University of Chicago Press, 1965.

Ekman, P. & Friesen, W. (1982). Felt, false, and miserable smiles. Journal of Nonverbal Behavior, 6(4), 238-252.

Ekman, P. & Friesen, W. (1978). The facial action coding system. Palo Alto: Consulting Psychologists Press.

Emde, R. & Harmon, R. (1972). Endogenous and exogenous smiling systems in early infancy. Journal of Child Psychiatry, 11(2), 177-200.

Friesen, W. & Ekman, P. (1984). EMFACS: Emotion Facial Action Coding System (Available from W. Friesen, Department of Psychiatry, University of California, San Francisco.

Hiatt, S., Campos, J. and Emde, R. (1979). Facial patterning and infant emotional expression: Happiness, surprise, and fear. Child Development, 50, 1020-1035.

Izard, C. (1983). MAX: The maximally discriminative facial movement coding system. (Available from Instructional Resources Center, University of Delaware, Newark, Delaware).

Izard, C., Dougherty, L. & Hembres, E. (1983). AFFEX: A system for identifying affect expressions by holistic judgements. (Available from Instructional Resources Center, University of Delaware, Newark, Delaware).

Peiper, A. (1963). Cerebral function in infancy and childhood. B. Nagler & H. Nagler (Trans.). New York: Consultants Bureau.

Rosenstein, D. & Oster, H. (1987). Differential facial responses to four basic tastes in newborns. Unpublished manuscript.

Sroufe, L.A. & Wunsch, J. (1972). The development of laughter in the first year of life. Child Development, 43, 1326-1344.

Steiner, J. (1979). Human facial expression in response to taste and smell stimulation. In H. Reese & L. Lipsitt (Eds.), Advances in child development and behavior. Vol. 13. New York: Academic Press.

Vaughn, B. & Sroufe, L.A. (1976). The face of surprise in infants. Paper presented at the meeting of the Animal Behavior Society, Boulder, Colorado.

Wolff, P. (1963). Observation on the early development of smiling. In B. Foss (Ed.), Determinants of infant behavior, II. New York: Wiley.

Wolff, P. (1987). The development of behavioral states and the expression of emotions in early infancy. Chicago: University of Chicago Press.

Table 1

Eliciting Circumstances for Facial Expression Patterns Associated with Negative Emotions

| Eliciting Circumstances | Facial Expression Pattern | | | |
|---|---|---|---|---|
| | Distress-Pain | Anger | Sadness | Disgust |
| Head/limb restraint | X | X | X | X |
| Nose aspirated with syringe | X | X | X | X |
| Sour vitamin | X | X | X | X |
| Bath | X | X | X | X |
| Innoculation | X | X | X | |
| Hunger | X | X | X | |
| Physical contact terminated (Put in seat or crib) | X | X | X | |
| Motion terminated (Swing stops) | X | X | X | |
| Waking up | X | X | X | |
| Sleep | X | | X | X |
| Pokes own face | | | | X |
| Strong light in eyes | | | | X |
| Rejects nipple/pacifier | | | | X |
| Eyes stroked | | | | X |
| Yawn | | | | X |
| Stretching | | | | X |
| After feeding | | | | X |
| Brings head forward | | | | X |
| Undetermined | X | X | X | |

Table 2

Eliciting Circumstances for Facial Expression Patterns Associated with Happiness and Surprise

| Eliciting Circumstances | Facial Expression Pattern | |
|---|---|---|
| | Surprise | Happiness ("Smile") |
| Takes nipple | X | |
| Visual attention to general environment | X | |
| Visual attention to face or object | X | X |
| Auditory stimuli (voice, rattle) | | X |
| Tactile stimulation (Cheek or back stroked) | | X |
| Kinesthetic stimulation (gentle bouncing) | | X |
| After yawn, sneeze, hiccup, "poop" | | X |
| Drowsy after feeding | | X |
| Sleep | | X |

FIG. 1
DISTRESS-PAIN

FIGURE 3
ANGER

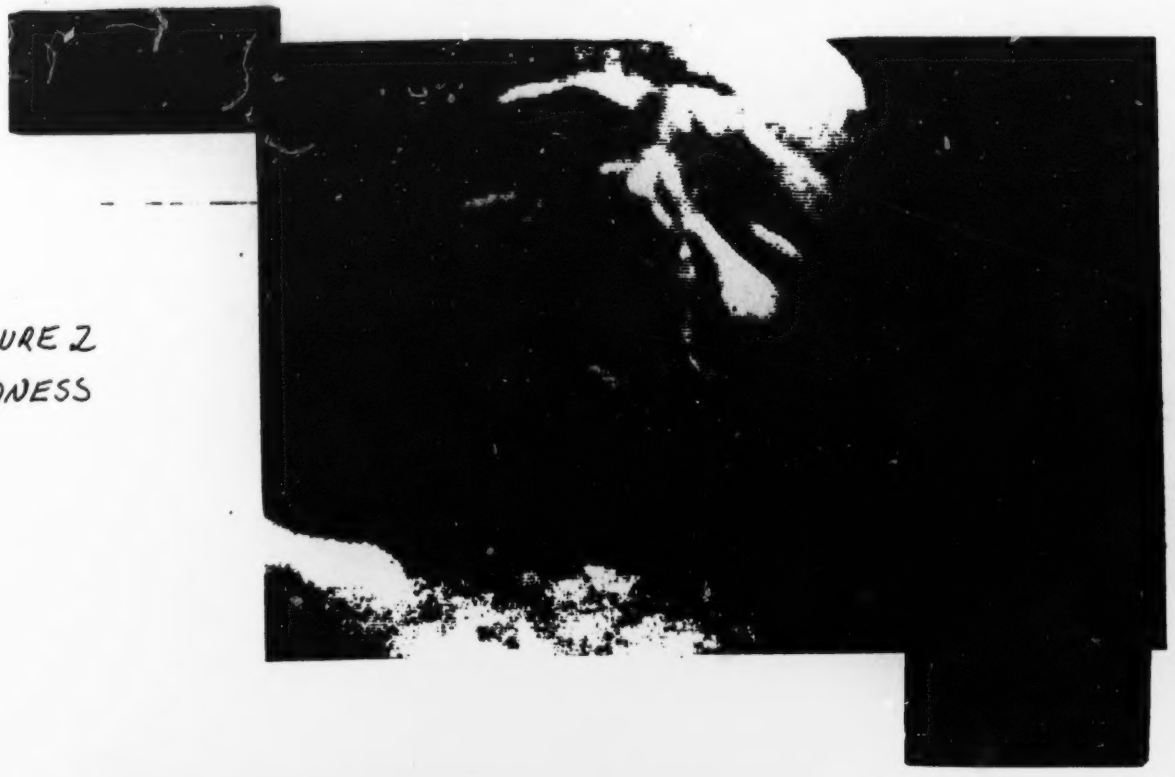

FIGURE 2
SADNESS

FIGURE 4
DISGUST

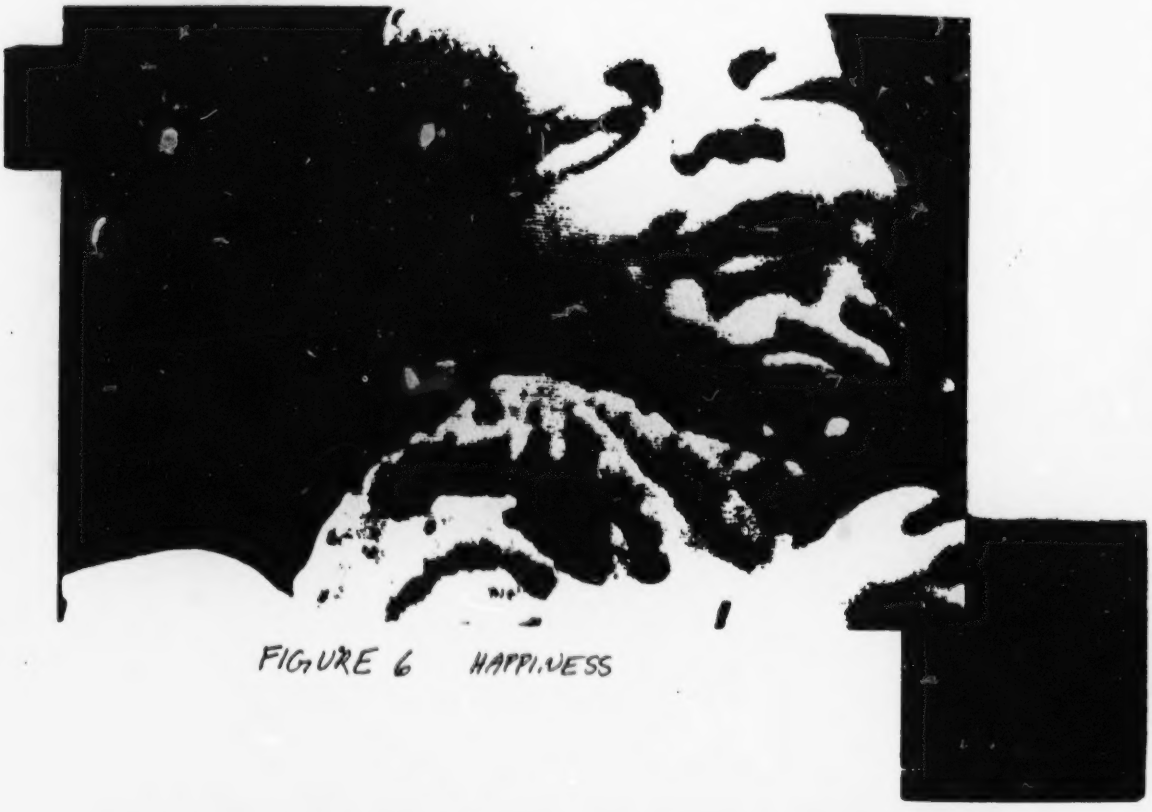

FIGURE 6 HAPPINESS

FIGORE 5 SURPRISE